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with the very fabric of the constitution of England. The Reports and Institutes cover the whole ground of the common law, from the prerogatives of the king and the privileges of parliament down to the lowest copyhold-tenure and the rights of villenage itself, expounding all the complicated doctrines embraced in these wide limits with a comprehensiveness in the design and a completeness in the filling up, which it was far beyond the skill of any of his contemporaries to out-do, excepting only sir Francis Bacon. And the writings of sir Edward undoubtedly effected no little of what the English Tribonian had so much at heart, namely, the amendment of the laws of his country by reducing them to an uniform system. For the English Institutes, although executed in a less masterly manner than the Roman, obviously stand, like the latter, between the old and the new jurisprudence, serving at the same time as a digest of the one, and as the foundation on which the other has been built up by the Hales, the Holts, the Mansfields and the Blackstones, who have flourished in England since the restoration of the Stuarts.



- ART. XIV.—1. *An account of the Varioloid Epidemic, which has lately prevailed in Edinburgh and other parts of Scotland; with observations on the identity of Chicken-Pox with modified Small-Pox: in a letter to sir James M^r Grogg, Director-General of the army medical department, &c. &c. By John Thomson, M. D. F. R. S. E. Surgeon to the Forces, &c. London and Edinburgh. pp. 400. 1820.*
2. *A History of the Variolous Epidemic, which occurred in Norwich in the year 1819, and destroyed five hundred and thirty individuals; with an estimate of the protection afforded by Vaccination, and a Review of past and present opinions upon Chicken-Pox and modified Small-Pox. By John Cross, member of the Royal College of Surgeons in London, &c. London. pp. 296. 1820.*

THE subject, to which the works before us relate, has within a few years excited much attention in Europe, both in the medical profession and in the public at large; yet it has scarcely been heard of on this side of the Atlantic. So completely have we been protected, in this country, by the practice of

vaccination, and the strictness of our quarantine regulations—the efficacy of which, with regard to *truly contagious diseases*, cannot be doubted—that we are almost in danger of forgetting the existence of the small-pox ; and, if we hear of its occurrence in other countries, it excites no other emotion than surprise that any part of the world should still continue to be infested by a disease, which, as experience in our own case seems to have proved, might be so easily exterminated. Yet, however great reason we may have to congratulate ourselves on the exemption we enjoy, recent events prove, that it is necessary we should continue on our guard, and persevere in those measures by which we have been hitherto protected ; lest hereafter we should undergo visitations of disease as unexpected and fatal, as those which have been experienced in Europe.

An eruptive disease has within a few years made its appearance in Scotland, in England, and in several other parts of Europe, and prevailed epidemically to a considerable extent ; and although in general resembling the small-pox, yet it has been attended by so many circumstances apparently anomalous, that some doubt has been at times entertained whether it were not a new disorder of an analogous character, but dependent on a different contagion. It is now, however, generally admitted to depend for its existence upon the variolous contagion, and to present phenomena unlike those which are usually observed, in consequence of the particular circumstances of the individual whom it affects.

This epidemic differs from the small-pox, as it has usually prevailed, in some important particulars. It has affected many who have previously passed through the small pox, either natural or from inoculation, and in these it has usually appeared in a mitigated form ; it has attacked, very frequently, those who have been formerly vaccinated, and in these the disease has been still milder and exhibited the symptoms which characterize what has usually been called the modified or five-day small-pox ; and it has presented in many cases, both of the genuine and modified small-pox, so close a resemblance to the disease called *varicella*, or chicken-pox, that they have been frequently mistaken for each other, and the most accurate and experienced judges have found great difficulty in making the *diagnosis* between them. But at the same time that these circumstances have been observed, the

small-pox has been prevailing extensively in its most malignant and fatal form among those individuals who have neither been vaccinated nor previously undergone the variolous disease.

These facts, which are so much at variance with the commonly received opinions upon the subject of small pox, seem to show ; either that some change has taken place in the laws by which the disease is governed ; that some of the facts relating to it have been hitherto overlooked or carelessly observed ; or that a wrong explanation has been given of them. Certainly till within a few years one attack of the small pox was believed to render an individual secure against a second ; for as no more than one in several thousands was supposed liable to such an event, the chance in any particular instance was diminished to almost nothing. Indeed many denied altogether the possibility of such cases, ascribing the accounts of them to the inaccuracy or mistake of their narrators, and believing them to have been deceived by aggravated cases of chicken-pox, or by some anomalous disease. The reliance upon the efficacy of the cow pox was little less entire, for although there had been a few instances of the variolous after the vaccine disease, yet it was easy to attribute these to imperfect or spurious inoculation ; and although the modified small pox, had been for some time known to exist, produced occasionally in vaccinated subjects by exposure to variolous contagion or inoculation, yet this had been too rare and too mild a disease to excite any alarm, and had never been known to prevail as an epidemic. Under these circumstances it was not strange that much doubt and distrust should be excited, that the faith of many in the efficacy of vaccination should be shaken, and that various hypotheses should be resorted to, to explain the apparent anomalies which were presented. In order, however, to give a clearer view of the subject, before adverting to any explanation which can be given of the difficulties it presents, we proceed to give a slight sketch of the history of the epidemic, as it appeared in various places.

Its first appearance in Scotland, we believe to have been at Forfar in the month of October 1813. In that place it affected both the vaccinated and those who had undergone neither the vaccine nor the variolous disease. In the latter class of subjects, it exhibited very clearly, in the opinion of the medical practitioners, all the characteristic symptoms of small-pox ;

but in the former, its course and appearance were so different, as to occasion some doubt whether it were really the same disease, had it not seemed to have been always produced by the variolous contagion. The number of these cases amounted to a hundred and fifty; and in addition to them, the contagion produced small-pox in six individuals who had previously passed through it either naturally or from inoculation.

In 1815, the *varioloid epidemic*, for by this term it has been designated to distinguish it from the small pox as it usually prevails, appeared in Edinburgh; in 1818 and '19 it again appeared and was prevalent in that city. It presented itself likewise in Cupar in Fife, in St. Andrews, in Dundee, and in various other places in Scotland, exhibiting every where the same general aspect and confirming the same general facts.

Dr Thomson enters into a particular account of five hundred and fifty six cases of the epidemic, as it appeared in Edinburgh and its vicinity, which came under his particular observation. Of this number two hundred and five occurred in persons who had passed through neither small-pox nor cow-pox, and these exhibited all the decided characteristics of the true variolous disease, in different degrees of severity. Of the whole, fifty died, giving a proportion of deaths nearly as one in four, and of course the cases were for the most part of a severe and dangerous character. Forty-one of those who were affected by the epidemic, had passed through either the natural or inoculated small pox, at intervals of time varying from ten days to fifteen years before their present attack. In these, the disease possessed the same general characteristic symptoms, but in a milder degree, and resembled the cases which have been formerly described under the names of horn-pox, sheep-pox, swine-pox, &c. In addition to the results of his own observation, Dr Thomson became acquainted with thirty similar instances which occurred under that of others, and of the whole, seventy-one in number, only three died; about one in twenty-three. In the remaining three hundred and ten individuals, vaccination had been performed, at intervals of time from a few weeks to fifteen years before. These were all affected with the small-pox modified, or, in other words, the varioloid disease; a mild complaint bearing a general resemblance in its progress to the small-pox, but much shorter in its duration and leaving the patient without an attack of secondary fever. Of the three hundred and ten, forty had a

second attack of the same disease at different intervals and with various degrees of severity. Of the whole number, one died ; but in this case, there was a complication of symptoms arising from other causes, to which the death was, partly at least, to be ascribed.

The epidemic small-pox, as it appeared in Norwich, corresponded in all its essential particulars, to that which prevailed in Scotland. Vaccination had not been very extensively adopted among the poor, and there were consequently fewer cases in proportion, of the varioloid disease among the vaccinated, than in Scotland. The disease itself was likewise more mild and the mortality less in proportion. Still from the great number of the *unprotected*, that is, of individuals who had gone through neither the variolous nor vaccine disease, the sickness was extensive and the mortality considerable. Of somewhat more than three thousand who suffered from the small-pox, five hundred and thirty died, about one out of six. Of one hundred and twelve families, in which Mr Cross personally attended during the prevalence of the epidemic, containing in all six hundred and three persons, two hundred were affected with the small-pox, and forty-six died. Of the remaining individuals of these families, two hundred and ninety-seven were secured by previous small-pox ; ninety-one had been vaccinated, ten had resisted the small-pox formerly, and these with five others, children, resisted it during the epidemic. Of the vaccinated, two were affected with the modified small pox from exposure to the contagion, one with what was called chicken-pox, and three others with some slight eruptive disease, not seen by a physician. Mr Cross is of opinion, that about one in twenty of the vaccinated in the city were attacked by some affection of this kind during the epidemic. He relates six well authenticated cases of genuine small-pox after vaccination, two of which died, and several instances of its occurrence for a second time in the same individual.

At nearly the same period the small-pox made its appearance in Derby, Liverpool and Plymouth in England ; in Douglas and other places in the Isle of Man ; in Millau, Montpelier and Marseilles in France, in Geneva, in various parts of Holland, and in the kingdom of Wirtemberg, exhibiting every where nearly the same phenomena, with the same exceptions to the usual laws of its progress which had been observed in Scotland. Every where a proportion of the vaccinated, dur-

ing the prevalence of the epidemic, were affected with the varioloid disease, at the same time that the unprotected were laboring under genuine small-pox. At Millau, a town in France containing about eight thousand inhabitants, two hundred vaccinated subjects fell ill with the modified small-pox, not one of whom died; whilst at the same time two hundred children, who had not been vaccinated, were destroyed by the genuine disease.

The circumstances we have detailed in this sketch of the history of this epidemic are almost sufficient alone to satisfy us of the identity of the small-pox and varioloid disease, and their common origin from the same contagion. But there are others by which this may be farther confirmed. The varioloid disease existing in the vaccinated produces the variolous in the unprotected, and on the other hand is produced by it, the contagion seeming to pass from one subject to the other unaltered in its nature and only producing different effects in different individuals according to the state of their several constitutions. Inoculation with the matter of the varioloid eruption will excite true small-pox in the unprotected, and the virus of small-pox will occasionally induce the varioloid disease in the vaccinated. Still further, it has been produced by Dr Willan, by inoculating with the variolous and vaccine matter at the same time, and the same result has followed when an individual who has been exposed to the contagion of small pox is inoculated with the matter of cow-pox before the symptoms of the former have begun to manifest themselves.

The question now naturally occurs how are we to account for the facts, established by the experience of this epidemic, which appear to contradict former experience and belief. These facts are in substance these, that genuine unmodified small-pox has, not unfrequently, occurred for a second time in the same individual, and has also occasionally taken place after vaccination; and that a mitigated eruptive disease has been produced, in a very considerable number of those who have been vaccinated and in many of those who have had small pox, by exposure to the variolous contagion; that these cases have exhibited great varieties of symptom in different individuals, in many corresponding to the disease known by the name of modified small-pox, in many presenting appearances so similar to those of the chicken-pox as frequently to be mistaken for that disease, and to induce many physicians to

believe that the chicken-pox is only one of the forms in which small pox is sometimes presented.

With regard to a second attack of genuine small-pox, we are not sure there is any sufficient reason for believing that it has lately occurred more frequently than it formerly did. The fact probably is, that it has not been heretofore so uncommon an event as we are apt to imagine. Mr Hennen, a surgeon of distinction, has given a list of no less than a hundred and fifty medical writers who have recorded instances of this kind. The increased number of well authenticated cases, we are inclined to attribute to the more strict attention which has been lately paid to such occurrences, to the more liberal and unprejudiced manner in which they have been observed, and to the growing habit of communicating such observations, candidly, to the public. The belief on this subject, as on many others in medicine, seems to have been handed down, without undergoing a very strict investigation, from generation to generation. We are slow in giving credence to facts whose tendency is to overthrow principles we have always regarded as firmly settled, and very ready to seek for some method of accounting for them which shall explain them away, without breaking in upon our established habits of belief.

It is, however, more difficult to account for the facts relating to the prevalence of modified small-pox or the varioloid disease after vaccination and after previous small-pox. The cases which have followed vaccination have been by far the most numerous, and have more constantly accompanied the epidemic in considerable numbers, than those which have succeeded the small-pox, and we shall first proceed to notice some of the explanations which have been given of their occurrence.

A circumstance, to which the Directors of the National Vaccine Establishment attribute the frequent failures of the cow-pox to give complete protection, is, that the 'process has not been conducted on the plan recommended by this board, and which experience has proved to be the most efficacious.' This plan is no more than to make at least four separate insertions of the matter, and to leave at least one vesicle to run its whole course without being opened. That this method is the more likely to insure the production of the disease in any individual instance is clear enough, but that it is more certain to communicate it efficaciously is unsupported by any proof whatever. The cow-pox is truly a specific disease. If an

individual has it at all, he has it completely, there is no taking it by halves. One true vesicle which goes regularly through its course is as good as a dozen, just as in inoculated small-pox, twenty pocks are believed to be as good evidence of an effectual disease as so many hundred. There may be a difference as to the degree in which the system feels the disease, denoted by the degree of constitutional sympathy, but not as to the actual affection of the system itself or the completeness with which it is pervaded. Indeed, it does not seem to be required that the whole four or any particular number of the punctures should take effect and excite vesicles; and we have little doubt that one genuine vaccine vesicle out of four punctures is considered at London, as effectual as one out of two is at Edinburgh. Indeed the experience of the epidemic shows, that the method of inoculation practised in Scotland, which has been by one or two punctures only, was found perfectly effectual in the large majority of instances to prevent the small-pox, and in others to modify it when excited; and no difference was observed between those who had had only one, and those who had two, three, or four vesicles, in their power of resisting the variolous contagion. And as has been observed by a writer in the *Edinburgh Medical and Surgical Journal*, 'While on the one hand in many cases, vaccination, which the establishment would have called perfect, has given imperfect security, there have been on the other hand many cases in which vaccination, which they would have called imperfect, has given perfect security.'

As to the deterioration of the vaccine matter in passing through a succession of individuals, it is remarked by Dr Thomson, that such a fact 'would present an anomaly in the history of contagious diseases, for I am not aware that any thing analogous to this alleged deterioration has ever been observed to occur in any of the other contagious diseases that are capable of being communicated by contact or inoculation from one human being to another. I know, in point of fact, that the vaccine virus which has been used at the Royal Public Dispensary here, and in other parts of Scotland, for a series of eighteen years, still continues to produce in those who are inoculated with it, the very same appearances which it produced on the first trials which were made with it, and that these appearances agree exactly with those which have been delineated and described by Dr Jenner as characteristic of cow-

pock; and I know also, that the appearances of the vaccine vesicle produced by this matter which must have passed through a succession of at least nine hundred individuals, agree exactly with those exhibited by vesicles produced by inoculation with the more recent equine matter with which I have been favored by Dr Jenner. Besides, I have seen a variety of instances, and have heard of more in which the varioloid disease during its late prevalence in Scotland, has attacked individuals who had been inoculated with cow-pock matter at an early period of the practice of vaccination obtained from the most authentic sources.' *Thomson*, pp. 315—16.

Neither is it probable that the destruction of the vaccine vesicle in its early stages, by scratching, rubbing, or the abstraction of matter for use, on which Mr Cross lays some stress, will account for any considerable proportion of the cases. Some of these accidents frequently take place, and no doubt it will sometimes happen that by the destruction of the vesicle in its early stage, the disease may be cut short. But when this has any effect in arresting the progress of cow-pox it must leave the individual afterwards liable to attack from small-pox in its genuine form, whereas this is a very rare occurrence, and the usual character of the disease to which such persons are subject is the varioloid. The vaccination then must have produced some effect upon the system, and as we have before observed, if the disease exists at all, it affects the constitution as thoroughly as it is capable of being affected. The destruction of the local affection, after the system is once impregnated with the disorder, will no more cut it short, than quenching the match will extinguish the flame which it has kindled.

Another explanation of the phenomena of the epidemic has been, that the protecting power of vaccination is weakened in time, and this is a question of very considerable importance to determine. Many vague opinions and vague statements have been promulgated with relation to this point, but there are no facts which afford any absolutely decisive evidence. A few of those who have written on the subject, observe, that they have thought the varioloid disease more likely to occur, and more severe when it did occur, in those who had been vaccinated for a considerable length of time, than in more recent cases; but the general opinion is upon the whole, that the power of the cow-pox is not diminished by time. Dr Gibson

of Lanark, states, that of two hundred and fifty-one cases of varioloid disease, rather more than one fifth appeared within the first year ; that one hundred and nine occurred within the first five years, eighty-two in the next five, and the remaining sixty between ten and seventeen years after vaccination. In nearly all the statements the greater number of cases have happened within the first two years and in short the varioloid disease has occurred at all periods of time from a few weeks, or even days, to twenty years after vaccine inoculation, and perhaps the most severe, though not the most frequent cases have taken place where several years have elapsed, but this is rather to be attributed to the greater age of the patient than to the diminished power of the cow-pox, since it has always been found that the severity of the small-pox is increased as the subject is advanced in years.

The work of Dr Thomson is principally written with a view to establish his theory of the identity of chicken-pox and small-pox, and their mutual dependence on the same contagion ; it cannot be denied that this, if proved true, affords a better explanation of the circumstances attending the epidemic itself, than can be given in any other way, although it does not well correspond with what has been previously known and believed of the nature and history of these diseases. It is stated by many, indeed by nearly all the practitioners who have written on this subject, that the milder cases of the small-pox, and many of those of the varioloid disease were at first supposed by them to be chicken-pox, and that they were only convinced to the contrary by the most undoubted proof that the whole were the result of the variolous contagion. The history of the cases which appeared in the castle in Edinburgh, of which Mr Hennen gives an ample account, seems first to have suggested to him the hypothesis which he has adopted and attempted to defend. The facts with regard to those cases were in short, that a son of Mr Hennen who had been vaccinated ten years before, had two perfect cicatrices on his arms, and had been repeatedly exposed to the contagion of small-pox in different places, was taken ill with a disease supposed to be aggravated chicken-pox. Under this impression six individuals were inoculated with matter taken from his body, who had undergone neither the variolous nor the vaccine disease, and in them the result of the operation was the inoculated small-pox. From them the same disease was communicated

by exposure to a number of other individuals, one of whom died. Many cases of the same general character are adduced by Dr Thomson to show that the same contagion produced small-pox and chicken-pox indiscriminately, and that there were no cases of the latter disease which could be traced from individual to individual, and proved clearly not to have been connected either in their origin or consequences with the former. His object on the whole is to show that chicken-pox is nothing more than a disease produced by the contagion of small-pox, but rendered mild, and varied in its characteristics, either by cow-pox, previous small-pox, or by peculiarity in circumstances or of constitution. He adduces much evidence to show that chicken-pox has seldom been known to occur in those who have been affected by neither small-pox nor cow-pox, and seldom prevailed epidemically without the occurrence of cases of the small-pox at the same time; all which is what would be expected to happen on the supposition that his hypothesis is well founded.

But without entering into a consideration of the objections to this system, derived from the history and appearance of the chicken-pox itself, we may briefly observe, that the question may be speedily put to rest by a reference to the experience of this country for the last twenty years. Chicken-pox, in the form described by Dr Willan and other accurate observers in Europe, is a disease here of frequent occurrence, prevailing equally in all classes of subjects, whether they have undergone small-pox or cow-pox or neither, exhibiting in its severe forms a near approach to the milder cases of small-pox, but never giving rise to any thing like a strongly marked case of that disease. Now this is a fact notorious to every practitioner of medicine among us, and is alone sufficient to settle the controversy. Small-pox has been in effect exterminated with us by the introduction of vaccination, and yet chicken-pox continues to exist. Were the opinion of Dr Thomson correct, this ought not to be the case; we ought, either to be entirely free from both these diseases or from neither, for neither could prevail singly. There are thousands, more particularly in the interior parts of our country, who have never undergone vaccination nor the variolous disease. These are, no doubt, frequently exposed to the contagion of chicken-pox under circumstances the most favorable for its communication, and should, in a few cases at least, suffer the disease in the form

of small-pox were the two affections the same. It is desirable that a collection of the facts on this subject, although of no immediate practical importance, should be made with a view of illustrating the history of the chicken-pox in this country, and by that means settle the controversy which seems yet to be carrying on in Great Britain.

If then we can attribute the peculiar phenomena of the varioloid epidemic to none of the circumstances of which we have taken notice, the question still recurs, how are we to explain them ; and we do not believe that any better account can be given than that which ascribes them to some peculiarity in the constitution of the epidemic, which gave it more than ordinary power and increased the susceptibility of individuals to be affected by it. That the contagion of this epidemic has been unusually virulent, appears to be the general opinion of those who have been conversant with it. In particular years the mortality of variolous epidemics has not amounted to one in fifty ; ‘whereas,’ says Dr Thomson, ‘the mortality of the present epidemic has, according to my observation, been not less than one in four of the unprotected who have been attacked by it. When a variolous epidemic shall again occur of a milder kind it appears to me probable, that the number of those who may be attacked with secondary small-pox and with small-pox after vaccination, will be greatly diminished.’

It is obvious that small-pox, although depending upon a specific cause for its production, is yet capable of being so modified or mitigated by collateral circumstances, as to appear in very different degrees of severity. When prevailing epidemically it is rendered more frequent and more fatal by particular states of weather ; thus both in Edinburgh and Norwich there was a great increase in the number and mortality of the cases during the summer months. ‘It is known,’ says Dr Turner in a letter to Dr Thomson, ‘that in Africa small-pox cannot be communicated by inoculation during the Hermattan winds ; and I have heard it stated by a highly respectable practitioner in Calcutta, that during the hot season there, small-pox cannot be inoculated, that it ceases to spread, and that a slight, vesicular disease only prevails, which is regarded as chicken-pox.’ *Thomson*, p. 300. There are some individuals who seem to be under ordinary circumstances not susceptible to the contagion of small-pox. Mr Cross found

fifteen cases of this kind in a hundred and twelve families, consisting of six hundred and three persons ; but during the prevalence of the epidemic in its most violent stage, it was found that many people of this description who believed themselves proof against contagion were attacked by it. And the case of one person has been mentioned, who after living as an attendant for twelve years in a small-pox hospital unaffected by the disease, finally took it and died.

All this serves to show that small-pox, like other diseases, is produced easily or with difficulty, in a mild or severe form, according to the state of the system, as depending on natural constitution, the state of the weather, or the peculiar constitution of the epidemic ; and that the degree of susceptibility in any individual case may be varied to an almost indefinite degree by circumstances, some of which we can, and some of which we cannot perceive to operate. It was on this principle, that the practice was founded of carrying a patient through a course of preparatory measures before exposing him to the small-pox, in order that his system might be disposed to have the disease in its mildest form. The same considerations appear to us to explain, why cow-pox, although under ordinary circumstances an effectual preventive, has been found to fail during the existence of a malignant epidemic. Cow-pox probably protects the system from the influence of the variolous contagion, precisely as small-pox protects it ; by producing an indisposition to enter into that train of actions in which the disease consists, a want of susceptibility to the *stimulus* of the contagion. This is in effect very much the same thing to the constitution, as exists in those who are possessed of a natural power of resistance. Under the usual degree of exposure these are each found a sufficient protection ; but when the exciting causes of small-pox assume an extraordinary degree of violence, or when the unknown causes of epidemics have produced in those exposed to their influence a morbid predisposition, all these barriers are found to give way ; and individuals, who have been vaccinated, who have been inoculated for small-pox, or have before always resisted the influence of the contagion, become affected by the disease with greater or less severity, and in a greater or less proportion according to other circumstances, whose effects we cannot estimate.

We may observe, in confirmation of this opinion, that in London, where the contagion of small-pox is constantly pre-

sent, where 1051 individuals have lately died of it in a single year, cases of the disease in any form after cow-pox are very rare ; whilst at Edinburgh and in many other places in Scotland where it seldom appears unless casually introduced, they have been exceedingly common. The reason of which would be, that in London the disease was merely kept up by inoculation and the exposures consequent upon it, whilst in Edinburgh it was cherished and propagated by a general predisposition which had been in some way excited among the inhabitants of the districts where it prevailed. A predisposition, not necessarily perhaps to this particular disease, but one which rendered the system liable to be affected by any other, of which the appropriate exciting causes should be applied. And it actually happened, that at Edinburgh and some other places a fever of the typhus character was prevailing epidemically at the same time with the small-pox.

When these circumstances are considered, it does not appear so extraordinary, nor inconsistent with former experience, that cow-pox should not prove so perfect a safeguard against the small-pox as it was at first supposed. When the cow-pox was originally put to the test, it was done by inoculation, by the exposure of individuals to the atmosphere of a small-pox hospital for a longer or shorter time. It was supposed at that time, and indeed would be generally now supposed, that those who were capable of having small-pox at all, would take it in this way. Besides the number of vaccinated subjects who are thus exposed, must, from the nature of the case, be extremely limited. Now this is something very different from the exposure of the whole inhabitants of a large city to the contagion of the small-pox in its most malignant form, assisted too in its ravages by the existence of an epidemic predisposition to disease, affecting all who were exposed to its influence ; and it is only under such circumstances that the failures of cow-pox have been frequent. We may likewise add, that it is not improbable that many more cases of modified small-pox after vaccination have formerly occurred, than has been believed, and from their near resemblance in appearance to the chicken-pox, have been attributed to the contagion of that disease. This we are persuaded must have been the case with respect to most of those instances where the small-pox, in its modified form, has attacked an individual for a second time. It is not probable that any great change

can have taken place in the laws of this disease. It is much more likely that under similar circumstances it formerly appeared as frequently for the second time as it has lately, but that physicians, strongly impressed with a belief that such an occurrence was almost impossible, admitted only the few severe cases to be truly variolous, whilst all the remainder were attributed to chicken-pox or classed together as spurious diseases under the names of horn-pox, swine-pox, sheep-pox, stone-pox, &c. and these, it is to be remarked, were generally found to prevail at the same time with the small-pox, indeed seldom or ever appeared at any other, and were therefore probably cases of small-pox mitigated in consequence of the previous occurrence of that disease.

It is sufficiently obvious, from the statements which have been already made, that there is no cause for relinquishing our faith in the value of vaccination. Indeed the experience of the late epidemic has had rather the effect to strengthen the confidence of those who had an opportunity of observing its effects. The safety, the mildness, the short continuance of the disease in the vaccinated, was so strongly contrasted with its severity, and its fatality in the unprotected, as to produce perhaps a more sensible impression upon the lower classes of the community of the advantages of vaccination, than would have been produced by their entire exemption. Of such importance, however, is it, that this point should be clearly made out and fully understood, that we deem it proper to dwell more particularly upon the direct evidence which goes to establish the efficacy of vaccination lest any misconception of the facts as they have been stated should lessen the faith of any in this invaluable discovery.

It appears then to be established beyond the reach of doubt, that a very large majority of the vaccinated resist the small-pox under *all circumstances of the most intimate exposure to its contagion*. It is of course extremely difficult to state the exact proportion of those who do suffer, yet we have some data from which a general estimate can be formed. According to Mr Hennen, only one out of eighteen of the vaccinated children in the castle at Edinburgh took the small-pox. In the work of Mr Cross, as we have already seen, of ninety-one individuals who had been vaccinated in one hundred and twelve families, but two were affected with modified small-pox, one of whom had only twenty pustules; one was attacked

with what was called chicken-pox, and three others with slight eruptive diseases, not seen by a physician, the severest having only eleven pustules. These families were of the poorer class, where many individuals were crowded into one room, and where the vaccinated were constantly sleeping in the same bed with those laboring under the natural small-pox. But in addition to this—

‘In the month of June,’ says Mr Cross, ‘I visited five hundred families in those parts of Norwich where I was least acquainted, in order to ascertain the proportion and extent of the failures after vaccination. In the course of these visits I took an account of thirteen hundred and seventy-seven persons under twenty years of age. Of these, three hundred and fifty-eight had small-pox formerly; three hundred and fifty-seven were seized with it lately, and fifty of them had died; four hundred and twenty had been vaccinated at different periods from fifteen years to a few weeks, and eleven of these had lately suffered from an eruptive disease, unattended with danger, but seeming in most of them to have been modified small-pox; two hundred and forty-two were still liable to small-pox. In thirty-one families, those who had had cow-pox were living in the same room or lying in the same bed with others, suffering or dying from natural small-pox, yet remained perfectly safe, with the exception only of one child, whose mother reported that it had *ten* pustules! From some cases which I had seen in other quarters and of which a more particular account will be given, I was surprised to find no more serious failures after vaccination, and was astonished, considering the way in which the practice is unavoidably conducted among the poor, to find it so very effectual. Altogether in the course of five months I met with seventy-seven families where the vaccinated were in the same room with small-pox; and none of them had any serious disease, and not above one in thirty had any eruptive disease at all.’ p. 38.

He observes subsequently—

‘Including the mildest cases, which compose the majority and have been continually regarded as chicken-pox proceeding from the variolous contagion, I believe that not more than one in twenty persons will be in any way affected by the most intimate exposure to small-pox in the same room, and that less than one in fifty will have the disease in a form answering to the generally received description of modified small-pox.’—‘Considering that these cases occur in the midst of the most destructive small-pox, and that the severer bear a close resemblance to this disease, nothing is more striking than the comparatively little danger which attends

them, scarcely an instance being on record in which they have proved fatal; and therefore they must be regarded as vastly milder than the small-pox produced by inoculation.' p. 192, 193.

It is seldom that in a vaccinated individual the disease is such as to be considered as the genuine unmitigated small-pox, and rare, very rare, that it proves fatal. Still, it cannot be denied, that there have been cases both of the occurrence of the small-pox unmodified, and cases also in which it has proved fatal in subjects who had previously been supposed to pass through the cow-pox. The proportion of such cases it is, of course, almost impossible to ascertain. The facts by which we come nearest to the truth are furnished by Mr Cross, whose indefatigable assiduity in searching into every part of this subject cannot be too highly praised; in the city of Norwich, containing above forty-seven thousand inhabitants, he calculates that there were about ten thousand who had undergone vaccination. Of these he was able to discover only six who had suffered from small-pox, and of these two died. But there was evidence that during the same period at least as many cases occurred of regular small-pox in those who had previously gone through that disease either in the natural or inoculated form; thus forming a complete offset to the cases after vaccination, and showing the cow-pox to be at least as perfect a security as the small-pox itself.

It is proper to notice here the strong probability which exists for believing that many of the cases where regular small-pox occurs in those who are supposed to have had cow-pox, may be owing to some imperfection in the processes of the latter disease, by which it is prevented from communicating its influence to the whole system. We have before given our reason for believing, that the great mass of cases of modified small-pox are not to be attributed to any such defect. But where the modifying influence is not at all perceived, there are not the same objections to the opinion that the occurrence of the disease is owing to imperfect vaccination, and when it is considered that many circumstances of apparently trifling importance are well known to obstruct the regular progress of the cow-pox, the probability is much strengthened that the small-pox occurs in some of those cases where such an obstruction has taken place. Very slight cutaneous diseases, rickets, scrofula, &c. have this effect.

‘An author,’ says Mr Cross, ‘who recently undertook an investigation of the causes of failure of vaccination in Silesia, has related that in 1816 above a hundred who had been vaccinated had small-pox in the same district, and some of them died. It appeared that they had all been vaccinated by the same surgeon, who was suspended from his appointment as vaccinator whilst an inquiry was instituted by a medical committee expressly appointed, to discover the sources of so much mischief. It was ascertained that the surgeon had been in the habit of taking ichor as late as the eleventh day, often from vesicles which had been rubbed or scratched, so as to be injured in their structure, and had even raised an imperfect scab to obtain what moisture he could from beneath it to vaccinate with.’ pp. 196, 197.

Frequent failures of vaccination are related by Dr Elsasser to have occurred in a district in the kingdom of Wirtemberg, where scabies was so endemic that not above one in fifty was free from it. It was found on inquiry that a child with scabies had been inoculated, and that the ichor from its arm had been used for vaccination and thus propagated an imperfect disease. It appears from the work of Mr Cross, that of five hundred individuals whom he vaccinated during the epidemic at Norwich, of whose cases he kept a record, only three hundred eighty-four had the disease satisfactorily. And although the greater part of the remaining one hundred and sixteen did probably undergo the cow-pox, yet there was not that full evidence of the fact, which should make the vaccinator feel secure that they were not liable to small-pox.

But in judging of the real value of the cow-pox we are not merely to look into its absolute merits as a preventive of the small-pox, but view it in comparison with the only other method which has appeared to offer any tolerable chance of lessening its ravages, the variolous inoculation. And we may make what seems at once a conclusive statement—that every individual who submits to this expedient, undergoes a disease more severe and dangerous than the modified small-pox as it occurs after vaccination, with this difference, that in the former case the disease and the danger are certain, in the latter they are contingent, and happen only to one individual out of fifty of the vaccinated. ‘Vaccination,’ says a writer in the *Edinburgh Medical and Surgical Journal*, ‘if not so good an antidote against small-pox as it was once thought, is at least the best that is to be had. And that this is the state of the fact no one can reasonably deny, who considers for a

moment the protection that was actually given in the city of Norwich to ten thousand vaccinated persons. Of these, we have seen that only two died of the small-pox, when a virulent epidemic visited the city, and affected almost every one who was liable to the contagion. Had these persons been protected by variolous inoculation, conducted in the best manner and under the most favorable circumstances, at least thirty-three of them, one in three hundred, would have died of the process intended to protect them; so that, in comparing the advantages of the two methods of prevention, we have to weigh two deaths *certain* against *two contingent on the invasion of an epidemic small-pox*; and then we have to consider, whether there might not be nearly as great a chance of two persons out of ten thousand inoculated for small-pox, taking fatal small-pox on exposure, at a subsequent period of life, to a virulent contagion.' No. 66, p. 127.

There is no doubt that an attack of small-pox, either regular or modified, is much more frequent after vaccination, than after the variolous disease itself; but on the other hand, the disease would seem to be in the latter case much more frequently fatal—for whilst Dr Thomson records only one death out of three hundred and ten who had modified small-pox after vaccination, he mentions three of seventy-one who were attacked with it for the second time. So that were this point capable of an exact investigation, it might appear that the number of deaths in the one class of individuals might be no more than a balance for those which occurred in the other; and thus the value of vaccination, as compared with the variolous inoculation, would stand as high as its most unqualified defenders have ever placed it.

This comparative statement would be conclusive against the variolous inoculation, supposing it to be universal and to produce all the good of which it is capable; but if we consider it as it has been managed, and judge of it by its effects, we believe it to be no extravagance to say that it has been of incalculable injury to mankind. To the rich and intelligent who could and would take advantage of it, it was a safeguard, but to the poor and ignorant who doubted of its efficacy or had not the means to avail themselves of it, it proved a destroying angel, carrying pestilence and death into a thousand quarters where they need never to have come. By a vigilant execution of judicious laws, small-pox, like the plague, might have been banished from Europe, but inoculation multiplied

the points from which the contagion spread and kept up the disease. So obvious was this effect of the practice, that in many countries it was forbidden by law. In Great Britain, however, it continued and continues till this day; and that not merely in hospitals, but patients have been permitted to be vaccinated abroad, and thus to carry the contagion among thousands whose poverty or ignorance prevents them from having recourse to the same safeguard, and whose miserable habitations and filthy habits give certainty and efficacy to the poison, whenever they are exposed to it.

It would not be difficult, we believe, to shew that in most instances of the epidemic, the small-pox has been first communicated or afterwards disseminated by means of the variolous inoculation. The disease when introduced into the city of Norwich remained almost dormant for nearly a year, affecting only a few individuals, until an alarm being excited, four or five hundred persons were inoculated, each of whom thus became the centre of contagion. And in the adjoining country,

‘Itinerant inoculators, irregular practitioners, and old women introduced and extended the disease to all quarters by inoculation, regardless of the admonitions given them, because the law authorized no direct measures against them. These disastrous effects were most severely felt in the county of Norfolk, the disease being thus continually introduced into parishes previously free from it.’ *Cross*, p. 219.

‘This injurious result of the practice of inoculation is depicted by many in the strongest and most feeling language. One surgeon states that, from the first person who casually fell down with small-pox in his neighborhood, forty were immediately inoculated, spreading the disease in all directions; another, that in four parishes out of five, where he attended variolous patients, the contagion was brought by an irregular practitioner, who went about inoculating; a third, that a child went to an adjoining town to get inoculated, and became the centre whence the contagion spread through all the parishes under his care; a fourth, that a man of bad character and not at all acquainted with medical subjects, had, for a small gain, made it his business to extend the disease far and near.’ p. 270.

Of the country surgeons in the neighborhood of Norwich, thirty-eight from various motives consented to communicate the small-pox by inoculation during the epidemic. Of those whom they inoculated, twenty-one died, and according to the usual proportion of deaths, the whole number who had submitted

to the disease under regular practitioners would be six thousand three hundred. 'Medical men, however, inoculated comparatively very few during the year of the epidemic. The greatest inoculators were the parents of poor children, farriers, blacksmiths, tailors, shoemakers, and old women.'

The effect which the introduction of the variolus inoculation had, to increase the actual number of deaths from small-pox, has been strikingly illustrated by sir Gilbert Blane, in the Transactions of Medical and Chirurgical Society of London, by a comparative statement of the mortality in London during four different periods of fifteen years each. The first includes the fifteen years immediately preceding the introduction of the variolous inoculation which took place in 1721; the second an equal length of time taken after the practice had become well established, beginning with the year 1745; the third refers to the fifteen years immediately preceding the discovery of vaccination ending in 1798; and the fourth embraces fifteen years, beginning with 1804, after vaccination had become extensively practised. The result of his computations exhibits the ratio of the number of deaths from small-pox to the whole number of deaths.

| | | | | | | | | |
|--------------|--------|---|----------|------|----|----|---------|---------------------|
| In the first | period | 1 | death in | 12.7 | or | 78 | in 1000 | were from small-pox |
| " second | " | 1 | " | 11.2 | or | 89 | in 1000 | " " |
| " third | " | 1 | " | 10.6 | or | 94 | in 1000 | " " |
| " fourth | " | 1 | " | 18.9 | or | 53 | in 1000 | " " |

Applying these estimates to the whole population, sir Gilbert calculates that 23,134 have been saved during the last period 'in the metropolis of that country, which has less adopted vaccination than any other civilized country in the world.' It is not a little remarkable that the nation, which has the glory of having discovered vaccination, should have done less than any other towards the extermination of the small-pox, although in none have the medical profession been more generally convinced of its value, or more cordially disposed to co-operate in its diffusion. The continuance of the practice of inoculation, which has been relinquished by the good sense or forbidden by the laws of other communities, seems to be the principal reason why a greater effect has not been produced. By the laws of Great Britain, the public propagator of small-pox, who for a trifling fee jeopardizes the lives of thousands, is only liable to an action for misdemeanor; and of the execution of the law which authorizes this there is only one instance, and that was of 'a parent who carried her

child through the streets of London whilst laboring under small-pox, from which *eleven* persons took the disease and *eight* died' The pertinacity with which the ignorant part of the public cling to their right of having the small-pox as their fathers had it, would be not a little ridiculous, were it less serious in its consequences. And these consequences, we are convinced by the statements of Mr Cross, must be more melancholy in the country than in cities, and could the calculations of sir Gilbert Blane be extended to the whole of Great Britain, the proportional increase of mortality from inoculation would probably be found greater. In fact, he observes, 'It was in the rural population that the effect of inoculation in diffusing small-pox was chiefly felt. In this situation there is much less intercourse of persons with each other than in towns, so that not only many individuals escaped from exposure to this infection during their whole life, but whole districts were known to have been exempt from it for a long series of years before it was universally diffused by inoculation.'

Even were vaccination far less effectual as a safeguard to *individuals* against the small-pox than the variolous inoculation, the power which it unquestionably possesses of completely exterminating the small-pox, gives it claims infinitely superior upon the attention of the world. This is and ought to be the principal object in view, and a few statements will be sufficient to settle every doubt of its practicability. So soon as the year 1804, no cases of the small-pox occurred in Vienna, with the exception of two strangers who came into the city with that disease upon them. In Denmark, vaccination was introduced in the year 1800, by laws which were rigidly enforced. By these it was ordered that no individual should be received at confirmation, admitted to any school, bound apprentice to any trade, or married, who had not been vaccinated, unless he had formerly undergone the small-pox. The effect has been that small-pox no longer exists and has scarcely been heard of since 1808; and whereas five thousand five hundred individuals died from it in the city of Copenhagen alone, for the twelve years preceding the introduction of vaccination, in the year 1805 not a single death occurred, and in the whole Danish dominions only one hundred and fifty-eight have occurred since the year 1802. In Prussia the effects of vaccination, diffused with the assistance of the public authority, have been almost equally decisive. Formerly, forty

thousand deaths were calculated to take place annually from the small-pox, whilst in 1817 they had been reduced to two thousand nine hundred and forty—the total number from all causes amounting to three hundred and six thousand seven hundred and twenty-eight; so that the proportion of deaths from small-pox to those from other causes has been reduced from one in seven to one in one hundred and four. And in Berlin, where the greatest exertions have been made to introduce vaccination universally, but where also they are much more liable, as in all great cities, to the introduction of small-pox, the proportion of deaths from that disorder was, in 1819, only one in two hundred fifty-four, whilst only two years before in London the proportion had stood as one in nineteen. In the principality of Anspach in Bavaria, containing a population of two hundred and sixty-six thousand four hundred and six individuals, five hundred died annually of small-pox in the years 1797, 1798, and 1799, and sixteen hundred and nine in the next year, 1800, giving a proportion in the former years of about one death in thirteen from small-pox, and in the latter of about one in four or five. In this state of things the cow-pox was introduced, and its diffusion promoted by laws which imposed fines and penalties on those who refused to submit to it. Inoculation for the small-pox was forbidden; and so positive has been the effect of the extension of this practice that from 1809 down to 1819 only four cases have occurred of the disease, and not a single death, and this too while the small-pox has been prevailing epidemically in the neighboring kingdom of Wirtemberg. In France prizes are annually distributed to those surgeons who have vaccinated the greatest number. The report of the central committee of vaccination for 1816 exhibits a striking view of the benefits derived from the practice in a single year. In 1815 from the unsettled state of public affairs it had been neglected, but was resumed in 1816 with great vigor. The effects were immediately perceptible from a comparison of the number of cases and deaths from small-pox in the two years. The vaccinations were increased and the cases of small-pox decreased in number one third, the deaths were not so frequent by one half, and the instances of disfiguration, blindness, &c. were proportionally lessened. The same committee had previously reported the extinction of the small-pox at Lyons and other districts. In Lombardy the small-pox had disappeared from all the large towns in 1808,

and in Milan had not been known for several years. In Geneva, as stated by Dr Oder, vaccination has extirpated the disease; and even when casually introduced, it does not spread, the inhabitants, from the universality of vaccination, having ceased to be susceptible. In 1811, as sir Gilbert Blane was informed by a delegate from Lima in Peru to the Spanish cortes, 'vaccination had been practised with so much energy and success in Lima, that for the last twelve months there had occurred, not only no death from small-pox, but no case of it; that the new-born children of all ranks are carried as regularly to the vaccinating house, as to the font of baptism; that the small-pox is entirely extinguished all over Peru; nearly so in Chili; and that there has been no compulsory interference on the part of the government to promote vaccination.'

Evidence of this kind might be easily multiplied to a much greater extent, but this would be unnecessary when we have in our own country a daily example of what vaccination is capable of doing towards the extermination of the small-pox. For although probably not a year passes that subjects labouring under this disease are not introduced among us, yet it is seldom, if ever, that they extend the disease beyond themselves. It is our duty to take care that by an indolent security we may not be induced to neglect the means to which we now owe our safety, and lay ourselves open to the future inroads of that pestilence from which our country has in former times most severely suffered.* There is little danger among the better classes of the community, that they will fail to adopt the necessary precautions for securing themselves. The great fear is, that, from the long continued absence of the disease, society will cease to take care of the health of those who can seldom be induced to take care of it themselves, the poor and uneducated. We have no public means by which we can feel certain that vaccination will be kept up among them; every thing has been left to depend upon the benevolence and activity of those practitioners who are principally applied to

* In 1721, the year in which inoculation was introduced, the small-pox visited Boston and the adjacent country. In Boston, five thousand eight hundred and eighty-nine suffered from the disease, of whom eight hundred and forty-four died; an immense proportion, considering the number of inhabitants at that time, and nearly equal to the total number of deaths at this period.

by the lower classes. The negligence and supineness of the poor with regard to vaccination is really astonishing; and as an example of it we may refer to Mr Cross's account of the pauper vaccination in Norwich. It appears, that a reward of half a crown was offered to every poor person who should bring a certificate of his having passed regularly through the cow-pox; and yet the number of rewards actually paid in a population of 47,000 were one year only eleven, and never exceeded sixty-four, except when an alarm of small-pox existed, which raised the number to three hundred and forty-eight.

The cause of vaccination is the cause of humanity. It is of the greatest importance that it should be seen in its true light, lest society deceived by an imperfect knowledge of any of the facts which have come to light with relation to it, should diminish their confidence in its powers. By its universal diffusion alone, can we hope to be delivered from the greatest scourge which has ever afflicted our species, from a disease the most disgusting and loathsome in all its forms, a disease which has been computed to sweep from the earth annually nearly a million of human beings, and to leave almost as many more in a state of blindness or disfiguration, a disease, which according to sir Gilbert Blane, has destroyed a hundred for every one that has perished by the plague.

ART. XV.—1. *Report with sundry Resolutions relative to Appropriations of Public Lands for the purposes of Education, to the Senate of Maryland, January 30, 1821. By V. Maxcy, chairman of the committee on Education and Public Instruction.*

2. *Report on the expediency of granting Public Land for the support of Education in the Senate of the United States, February 9th, 1821.*

3. *Report of the Committee on Colleges, Academies, and Common Schools, in the Legislature of New York, March 30, 1821, upon the Message of his Excellency the Governor, communicating the Resolutions of the Legislature of Maryland. By G. C. Verplanck, chairman of the committee.*

THE subject, which we are now about to consider, is manifestly of great national importance. It relates to a very exten-

ERRATA IN THE LAST NUMBER.

Page 86 *line* 4 from bottom *for* 'to it,' *read* 'it to.'
" 88 " 16 from top " 'West Florida,' " 'Spain.'
" 97 " 31 " " " 'Trumbull,' " 'Turnbull.'

IN THIS NUMBER.

Page 305 *line* 6 from top *for* 'vaccinated,' *read* 'inoculated.'
" 370 " 3 from bottom *read* 'the,' *before* 'factors.'
" 431 Highway robbery, under certain circumstances, is to be added to the list of capital crimes in Massachusetts, by a late statute.